Claims

I claim:

1. A method for providing a swim fin, comprising:

(a) providing a foot attachment member having a toe region;

(b) providing a blade member in front of said foot attachment member, said swim fin having a longitudinal alignment, said swim fin having a free end portion spaced from said foot attachment member, said swim fin having a predetermined longitudinal dimension existing between said free end portion and said toe portion, said swim fin having a longitudinal midpoint between said free end portion and said toe portion; and

(c) providing an elongated region of reduced material in said swim fin, at least one portion of said elongated region of reduced material being forward of said longitudinal midpoint, said at least one portion of said elongated region of reduced material having an alignment that is at an angle to said longitudinal alignment of said swim fin.

2. The method of Claim 1 wherein said elongated region of reduced material is a region of reduced thickness in said blade member.

3. The method of Claim 1 wherein said elongated region of reduced material is substantially straight.

4. The method of Claim 1 wherein said blade member has opposing surfaces and said elongated region of reduced material is an elongated depression within at least one of said opposing surfaces.

5. The method of Claim 1 wherein at least one elongated rib member is connected to said blade member, said at least one elongated rib member having sufficient flexibility near said foot attachment member to permit a significant portion of said at least one elongated rib member and said blade member to flex around a transverse axis near said foot attachment member to a significantly reduced lengthwise angle of attack during use.

6. The method of Claim 5 wherein a relatively flexible thermoplastic material is disposed within said elongated region of reduced material during a phase of an injection molding process.

7. The method of Claim 5 wherein a relatively flexible thermoplastic material is connected to said elongated region of reduced material with a chemical bond created during a phase of an injection molding process.

8. The method of Claim 1 wherein said blade member has outer side edges, two elongated rib members are connected to said blade member adjacent said outer side edges, said elongated region of reduced material being arranged to encourage said blade member to bow between said elongated rib members to form a longitudinal channel shaped contour under load.

9. The method of Claim 1 wherein said elongated region of reduced material is a region of increased flexibility within said swim fin.

10. The method of Claim 1 wherein said elongated region of reduced material is a transverse recess.

11. The method of Claim 10 wherein a flexible membrane is disposed within said transverse recess.

12. The method of Claim 1 wherein said elongated region of reduced material is an opening in said swim fin.

13. The method of Claim 1 wherein said elongated region of reduced material is transverse to said longitudinal alignment.

14. The method of Claim 1 wherein said alignment of said elongated region of reduced material is selected from the group consisting of transverse alignments and angled alignments.

15. The method of Claim 1 wherein said free end portion has a recess sufficient to divide said free end into two tip portions.

16. The method of Claim 15 wherein said recess forms inner edges of said blade member that may twist.

17. The method of Claim 15 wherein at least one portion of said blade member is arranged to be oriented at a transverse reduced angle of attack around a lengthwise axis.

18. The method of Claim 1 wherein said at least one portion of said elongated region of reduced material having said alignment is forward of said longitudinal midpoint.

19. The method of Claim 1 wherein at least one portion of said swim fin is arranged to flex to a reduced angle of attack, said blade member having a lee surface, said reduced angle of attack being sufficient to reduce the formation of turbulence around said lee surface of said blade member during use.

20. The method of Claim 19 wherein said reduced angle of attack is a lengthwise reduced angle of attack created around a transverse pivotal axis.

21. The method of Claim 1 wherein said elongated region of reduced material is able to encourage at least one area of said blade member to pivot to a reduced angle of attack during use.

22. A method for connecting a pivoting blade region to a swim fin, comprising providing a shoe member having a relatively flexible portion made with a relatively flexible thermoplastic material, said shoe member having a sole member and said swim fin having at

least one blade member, said sole and said at least one blade member are made with a relatively stiffer thermoplastic material, said shoe member having a toe region and said shoe member having at least two elongated stiffening members extending in front of said toe portion and being spaced apart in a sideways manner, said at least one blade member being pivotally connected to said swim fin in front of said toe region in an area between said stiffening members, said at least one blade member also being connected to said stiffening members with at least one flexible member.

23. The method of Claim 22 wherein said at least one flexible member is made with said relatively flexible thermoplastic material of said shoe member during a phase of an injection molding process.

24. The method of Claim 22 wherein said blade member has center recess that forms inner edges of said blade member that may twist.

25. The method of Claim 22 wherein said swim fin is arranged to bend around a transverse axis to a lengthwise reduced angle of attack during use.

26. The method of Claim 22 wherein said swim fin is arranged to oriented at a transverse reduced angle of attack relative to a lengthwise axis during use .

27. The method of Claim 22 wherein said at least one flexible member is a flexible membrane that is made with said relatively flexible thermoplastic material of said flexible portion of said shoe member during a phase of an injection molding process and is connected to said blade member with a chemical bond created during said phase of said injection molding process.

28. The method of Claim 22 wherein said shoe member and said elongated stiffening members form a substantially U-shaped structure and said at least one blade member is arranged to pivot around a transverse pivotal axis within said U-shaped structure.

29. The method of Claim 22 wherein at least one opening is disposed within said blade member.

30. A method for providing a swim fin, comprising providing at least one blade member connected to a foot attachment member, said blade member having free end portion spaced from said foot attachment member, providing said blade member with a transversely aligned flexible member between said foot attachment member and said free end portion, said transversely aligned flexible member being a transversely aligned region of increased flexibility in said swim fin, providing said transversely aligned flexible member with a relatively flexible thermoplastic material, providing said at least one blade member with a relatively stiffer thermoplastic material, said relatively flexible thermoplastic material being connected to said relatively stiffer thermoplastic material with a chemical bond created during a phase of an injection molding process.

31. The method of Claim 30 wherein said at least one blade member has a center recess.

32. The method of Claim 30 wherein said at least one blade member has a root portion near said foot attachment member and said at least one blade member has a recess extending from said free end portion toward said root portion and terminating at a base of said recess that is a predetermined distance from said load bearing structure.

33. The method of Claim 32 wherein said predetermined distance is selected from the group consisting of a significantly short distance and any desired distance.

34. The method of Claim 30 wherein said at least one blade member is at least one blade segment.

35. The method of Claim 30 wherein said transversely aligned flexible member is a region of reduced thickness within said relatively stiffer thermoplastic material.

36. The method of Claim 30 wherein said transversely aligned flexible member is a region of reduced material.

37. The method of Claim 30 wherein said transversely aligned flexible member is a flexible membrane disposed within a transverse recess.

38. The method of Claim 30 wherein said flexible membrane has at least one expandable fold.

39. The method of Claim 30 wherein said at least one blade member has a central blade portion and said transversely aligned flexible member is arranged to elongate during use to enable said central blade portion to drop so that said blade member forms a scoop like channel.

40. A method for providing a swim fin, comprising providing a blade member connected to a foot attachment member, providing said blade member with a transversely aligned region of increased flexibility, providing at least one portion of said transversely aligned region of increased flexibility with a relatively flexible thermoplastic material, providing at least one region of said at least one blade member with a relatively stiffer thermoplastic material, said relatively flexible thermoplastic material being connected to said relatively stiffer thermoplastic material with at least one chemical bond created during a phase of an injection molding process.

41. The method of Claim 40 wherein said transversely aligned region of increased flexibility is near said foot attachment member.

42. The method of Claim 40 wherein said transversely aligned region of increased flexibility is a transverse region of reduced material.

43. The method of Claim 40 wherein said transversely aligned region of increased flexibility is a transverse recess.

44. The method of Claim 40 wherein said transversely aligned region of increased flexibility is a transverse region of reduced thickness.

45. The method of Claim 40 wherein a flexible membrane is connected to said transversely aligned region of increased flexibility.

46. The method of Claim 45 wherein said flexible membrane arranged to expand during use.

47. The method of Claim 40 wherein said blade member has outer side edges, a root portion near said foot attachment member and a free end portion spaced from said foot attachment members, two elongated stiffening members are connected to said blade member near said outer side edges, and said transversely aligned region of increased flexibility is a zone of reduced thickness disposed within each of said stiffening members near said root portion.

48. The method of Claim 47 wherein said blade member has at least one vent.

49. The method of Claim 47 wherein said free end has a recess sufficient to divide said free end into two tip portions.

50. The method of Claim 47 wherein a recess is disposed within said blade, said recess originating near said free end portion and extending toward said foot attachment member and terminating at a base of said recess that is a predetermined distance from said foot attachment member.

51. The method of Claim 50 wherein said recess has inner edges that may twist.

52. The method of Claim 50 wherein said predetermined distance is selected from the group consisting of a significantly short distance and any desired distance.

53. The method of Claim 40 wherein two elongated stiffening members are connected to said blade member, and said transversely aligned region of increased flexibility is a zone of decreased thickness created near said foot attachment member to permit said stiffening members to achieve backward bending capability around a transverse axis near said foot attachment member.

54. The method of Claim 53 wherein said blade member has a center recess with inner edges that may twist.

55. The method of Claim 53 wherein said blade member has sufficient flexibility between said stiffening members to bow between said stiffening members during use to form a longitudinal channel shaped contour.

56. The method of Claim 53 wherein said blade member is arranged to bend around a lengthwise axis to a transverse reduced angle of attack during use.

57. The method of Claim 53 wherein at least one portion of said blade member is arranged to be oriented at a reduced angle of attack around a lengthwise axis during use.

58. A method for providing a swim fin, comprising:

(a) providing a foot attachment member having a toe portion;

(b) providing a blade member extending in front of said foot attachment member and having a longitudinal alignment, said blade member having outer side edges, opposing surfaces, a root portion near said foot attachment member and a free end portion spaced from said root portion and said foot attachment member, said blade member being made with a predetermined thermoplastic material;

(c) providing at least one elongated rib member connected to said blade member;

(d) providing a relatively softer thermoplastic member made with a relatively softer thermoplastic material that is relatively softer than said predetermined material of said blade member, said relatively softer thermoplastic member being connected to said blade member with a chemical bond created during a phase of an injection molding process, said relatively softer thermoplastic member having at least one portion that is forward of said foot attachment member in an area significantly between said outer side edges of said blade member;

(e) providing said swim fin with sufficient flexibility adjacent to said root portion to permit both said blade member and said at least one elongated rib member to experience a deflection during use from a neutral position to a significantly reduced lengthwise angle of attack relative to a transverse axis near said toe portion; and

(f) providing said swim fin with sufficient spring-like tension to snap said blade member and said at least one elongated rib member back from said significantly reduced angle of attack to said neutral position at the end of a kicking stroke.

59. The method of claim 58 wherein said at least one portion of said relatively soft thermoplastic element is oriented at an angle to said longitudinal alignment of said blade member.

60. The method of Claim 58 wherein said free end portion has a split tip.

61. The method of Claim 58 wherein said free end portion has a center recess sufficient to divide said free end into two tip portions.

62. The method of Claim 61 wherein said recess has inner edges that may twist.

63. The method of Claim 58 wherein said blade member is arranged to be oriented at a reduced angle of attack around a lengthwise axis.

64. The method of Claim 63 wherein blade member has a lee surface and said reduced angle of attack is arranged to create a reduction in turbulence around said blade member.

65. The method of Claim 58 wherein said significantly reduced lengthwise angle of attack is sufficient to significantly reduce kicking resistance.

66. The method of Claim 58 wherein said significantly reduced lengthwise angle of attack is sufficient to significantly increase the amount of water pushed in the opposite direction of intended swimming.

67. The method of Claim 58 wherein said blade member creates a propulsive force and said significantly reduced lengthwise angle of attack is sufficient to tilt said propulsive force significantly in the direction of intended swimming.

68. The method of Claim 58 wherein said blade member has a lee surface and said significantly reduced lengthwise angle of attack is sufficient to significantly reduce the formation of turbulence around said lee surface of said blade member.

69. The method of Claim 58 wherein at least one blade reinforcement member is connected to said blade member forward of said toe portion.

70. The method of Claim 69 wherein said at least one blade reinforcement member is made with a relatively stiffer thermoplastic material that is connected to said blade member with at least one chemical bond.

71. A method for providing a swim fin, comprising:

(a) providing a foot attachment member having a toe portion;

(b) providing a blade member extending in front of said foot attachment member and having a longitudinal alignment, said blade member having outer side edges, opposing surfaces, a root portion near said foot attachment member and a free end portion spaced from said root portion and said foot attachment member, said blade member being made with a thermoplastic material during an injection molding process;

(c) providing a thermoplastic member connected to said blade member with a chemical bond created during a separate injection molding process, said thermoplastic member being made with a separate thermoplastic material than said thermoplastic material of said blade member, said thermoplastic member having at least one portion that is forward of said foot attachment member; and

(d) providing a transverse region of significantly increased flexibility disposed within said swim fin near said toe portion that is arranged to permit said blade member to pivot around a transverse axis near said toe portion from a neutral position to a lengthwise reduced angle of attack during use, said region of increased flexibility being sufficiently flexible to create a region of increased bending near said toe portion as said blade member bends to said lengthwise reduced angle of attack.

72. The method of Claim 71 wherein said at least one portion of said thermoplastic member is forward of said toe portion.

73. The method of Claim 71 wherein said at least one portion of said thermoplastic member is a stiffening member.

74. The method of Claim 71 wherein said at least one portion of said thermoplastic member is a flexible membrane.

75. The method of Claim 71 wherein said separate thermoplastic material is more flexible than said thermoplastic material of said blade member.

76. The method of Claim 71 wherein said separate thermoplastic material is relatively stiffer than said thermoplastic material of said blade member.

77. The method of Claim 71 wherein said lengthwise reduced angle of attach is sufficient to significantly reduce kicking effort.

78. The method of Claim 71 wherein said lengthwise reduced angle of attach is sufficient to increase the amount of water moved in the opposite direction of intended swimming.

79. The method of Claim 71 wherein said blade member is provided with sufficient flexibility to bow between said outer side edges so as to form a lengthwise channel during use.

80. The method of Claim 71 wherein said free end portion has a recess sufficient to create two tip portions.

81. The method of Claim 71 wherein said blade member has a longitudinal center axis and said blade member has a split disposed within said blade along said longitudinal center axis.

82. A method for providing a swim fin, comprising:

a) providing a foot attachment member;

b) providing a blade member having opposing surfaces and outer side edges, said swim fin having a longitudinal alignment;

c) providing said blade member with at least one relatively wrinkled blade portion, at least one region of said relatively wrinkled blade portion having at least one wrinkle formed around an axis that is transverse to said longitudinal alignment of said swim fin.

83. The method of Claim 82 wherein said at least one wrinkle is arranged to experience expansion under load.

84. The method of Claim 82 wherein said at least one wrinkle is at least one fold.

85. The method of Claim 82 wherein said at least one relatively wrinkled blade portion is a flexible member made with a relatively flexible thermoplastic material.

86. The method of Claim 85 wherein said blade member is made with a relatively stiffer thermoplastic material that is connected to said relatively flexible thermoplastic material with a chemical bond created during a phase of an injection molding process.

87. The method of Claim 85 wherein said flexible member is a flexible membrane.

88. The method of Claim 82 wherein said blade member has a central blade portion and said at least one relatively wrinkled blade portion is arranged to elongate during use to enable said central blade portion to drop use so that said blade member forms a scoop like channel.

89. The method of Claim 88 wherein said blade member has at least one central vent.

90. The method of Claim 88 wherein said blade member has a split tip.

91. The method of Claim 88 wherein said blade member is arranged to bend around a lengthwise axis to a transverse reduced angle of attack.

92. The method of Claim 88 wherein said blade member is arranged to bend around a transverse axis to a lengthwise reduced angle of attack.

93. The method of Claim 88 wherein said blade member has a recess sufficient to form two tip portions.

94. The method of Claim 88 wherein said blade member has a longitudinal center recess sufficient to form two blade portions.

95. The method of Claim 82 wherein said at least one region of said relatively folded blade portion is a region of increased flexibility disposed within said blade member.

96. The method of Claim 82 wherein said wrinkle is a region of loose material that is arranged to expand during use.

97. A method for providing a swim fin, comprising:

a) providing a foot attachment member;

b) providing a blade member in front of said foot attachment member, said blade member having opposing surfaces, outer side edges, a root portion near said foot attachment member and a free end portion spaced from said root portion and said foot attachment member

c) providing two elongated rib members connected to said blade member near said outer side edges, said elongated rib members having at least one rib portion that has a predetermined vertical rib dimension; and

d) providing said blade member with a recess originating near said free end portion and extending toward said root portion and terminating at a base of said recess that is a predetermined distance from said foot attachment member, said recess defining inner edges of said blade member, said inner edges having at least one inner edge portion having a predetermined vertical inner edge dimension, said predetermined vertical inner edge dimension of said at least one inner edge portion being smaller than said predetermined vertical rib dimension of said at least one rib portion, at least one of said inner edges having at least one inner edge region having a predetermined alignment that

includes a transverse component of alignment and a lengthwise component of alignment, said lengthwise component of alignment being relatively large in comparison to said transverse component of alignment.

98. The method of Claim 97 wherein said recess is sufficient to divide said free end portion into two tip portions.

99. The method of Claim 97 wherein said recess is V-shaped.

100. The method of Claim 97 wherein said recess has a substantially wide V-shape.

101. The method of Claim 97 wherein said inner edges are curved.

102. The method of Claim 97 wherein said predetermined distance is a significantly small distance.

103. The method of Claim 97 wherein said free end portion has a predetermined free end transverse dimension and said recess having a recess transverse dimension that is less than said predetermined free end transverse dimension.

104. The method of Claim 97 wherein said inner edges may twist.

105. The method of Claim 97 wherein said rib members have a substantially round cross sectional shape.

106. The method of Claim 97 wherein said rib members have sufficient flexibility to flex around a transverse axis to a lengthwise reduced angle of attack during use.

107. The method of Claim 97 wherein said rib members have sufficient flexibility to flex around a transverse axis to a lengthwise reduced angle of attack during use, and said transverse axis is near said foot attachment member.